



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/687,125	10/16/2003	Andrew D. Ellington	CLFR:201USD1/10414091	8676
52034 7590 10/03/2007 FULBRIGHT & JAWORSKI, L.L.P. 600 CONGRESS AVENUE SUITE 2400 AUSTIN, TX 78701			EXAMINER TUNG, JOYCE	
			ART UNIT 1637	PAPER NUMBER
			MAIL DATE 10/03/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/687,125	Applicant(s) ELLINGTON ET AL.	
	Examiner Joyce Tung	Art Unit 1637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 July 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 5-9, 11-12 and 14-19 is/are rejected.
- 7) ☒ Claim(s) 2, 4, 10 and 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

The response filed 7/30/07 to the Office action has been entered. Claims 1-19 are pending.

1. The rejection of claims 1-19 under 35 U.S.C. 112, second paragraph, is withdrawn because of the applicant's amendment and argument.
2. The rejection of claims 1 and 5 under 35 U.S.C. 102(e) as being anticipated by Winnacker et al. (6,426,409, issued Jul. 30, 2002) is withdrawn because of the applicant's amendment.
3. All rejections under 35 U.S.C. 103(a) as being unpatentable over Huizenga et al. (Biochemistry, 1995, Vol. 34, pg. 656-665) respectively in view of Jhaveri et al. (J. Am. Chem. Soc. 2000, Vol.122, pg. 2469-2473), Heller (5,849,489, issued Dec. 15, 1998) and Meade et al. (5,591,578, issued Jan. 7, 1997) are withdrawn because of the applicant's amendment.

### NEW GROUNDS OF REJECTIONS NECESSITATED BY THE AMENEDMENT

#### *Claim Rejections - 35 USC § 112*

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:  

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.
5. Claims 3-4, and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
  - a. Claims 3-4 and 14 are vague and indefinite because in claims 1 and 12, it states that one of the four nucleotides is poorly represented and the poorly represented nucleotide occurs 1 to 3 times in said random insert, but in claims 3 and 14, it states that

Art Unit: 1637

the skewed mole ratio of the random insert of said nucleotides is 3:3:3:2:0.38. A:C:G:U.

It appears that the language is conflicting. Thus, it is unclear whether or not the skewed mole ratio is related to the frequency of the occurrence of the nucleotides in said random insert. Clarification is required.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 12 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Huizenga et al. (Biochemistry, 1995, Vol. 34, pg. 656-665).

Huizenga et al. disclose the isolation and characterization of a DNA aptamer that binds to adenosine and ATP in solution (See pg. 656, column 2, second paragraph). The DNA aptamer is made from the synthetic DNA pool via PCR (See pg. 657, column 2, fifth paragraph). ATP-agarose column was used and dATP is labeled (See pg. 657, last paragraph). The DNA is from the random sequence pool (See pg. 658, fig. 2). Huizenga et al. disclose the initial population of single-stranded random-sequence DNA molecules was generated by six cycles of 5' primer extension on a pool of DNA, which is PCR, amplified dsDNA molecules consisting of 72 random nucleotides flanked by 20 nucleotide primer binding sites (See pg. 658, column 2, last paragraph). The poorly represented nucleotides ~~are~~ occurred 1 to 3 times in a random insert (See fig. 7). In fig. 7 adenosine is interpreted as a poorly represented nucleotide because adenosine

Art Unit: 1637

occurs 3 times. Thus, the teachings of Huizenga et al. anticipate the limitations of claims 12 and 19.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1, 5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huizenga et al. (Biochemistry, 1995, Vol. 34, pg. 656-665) in view of Winnacker et al. (6,426,409, issued Jul. 30, 2002).

The teachings of Huizenga et al. are set forth in section 7 above. Huizenga et al. do not disclose a signaling aptamer comprising an RNA nucleic acid binding species.

However, Huizenga et al. discussed the difference between RNA aptamers and DNA aptamers. Overall the 2'-hydroxyl of RNA does not make it easier or harder to form stable or folded ligand binding structures (See pg. 664, column 2, second and third paragraph).

Winnacker et al. disclose a process for the identification and isolation of nucleic acid molecules, which are capable of distinguishing a prion protein isoform or peptide fragment or derivative of the prion protein isoform (See column 2, lines 37-41). The nucleic acid used is RNA, modified DNA single stranded or double stranded DNA (See column 3, lines 29-33). The randomized RNA pool M111.1 (See column 7, lines 8-10) is prepared by in vitro transcription from a DNA pool (See column 9, lines 22-24). Randomized sequence is 74 nucleotides (See column 9, lines 42). The RNA aptamer binds specifically to the cellular prion protein isoform (See column 10, lines 49-52). 5' [ $\gamma$ - $^{32}$ P]-ATP labeled or [ $\alpha$ - $^{32}$ P] UTP labeled RNA is selected (See column 8, lines 32-64). The ratio of A, C, G, U in RNA (A #1) aptamer in fig. 5 has 18:18:15:32 (A=18, C=15, G=32 and U=18) (See fig. 5 A #1). This teaching suggests that adenosine, cytosine and uridine are poorly presented nucleotides because adenosine, cytosine and uridine are occurred less than guanosine. As indicated previously, adenosine and uridine are labeled (See column 8, lines 32-64). It is inherent that the poorly represented nucleotide is labeled since RNA is [ $\alpha$ - $^{32}$ P] UTP labeled RNA (See column 18, lines 32-64). Since there is no definition regarding chemically modified nucleotides, this teaching satisfies the limitation as recited in claim 5.

One of ordinary skill in the art would have been motivated to apply the method of Winnacker et al. to make an RNA nucleic acid binding aptamer as claimed because Winnacker et al. disclose that the method allows for the identification of nucleic acid molecules (RNA, modified RNA) which bind with high affinity to a defined molecular target from a large randomized population of nucleic acid molecules (See column 2, lines 59-64). It would have been prima facie obvious to make an RNA nucleic acid aptamer as claimed.

Art Unit: 1637

10. Claims 6-7, and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huizenga et al. (Biochemistry, 1995, Vol. 34, pg. 656-665) in view of Winnacker et al. (6,426,409, issued Jul. 30, 2002) as applied to claim 1, 5 and 11 and as applied to claims 12 and 19 and further in view of Jhaveri et al. (J. Am. Chem. Soc. 2000, Vol.122. pg. 2469-2473).

The teachings of Huizenga et al. are set forth in section 7 and the teachings of Winnacker et al. are set forth in section 9 above.

Huizenga et al. do not disclose that the nucleotide is labeled with fluors.

Jhaveri et al. disclose that fluorescent dyes were placed adjacent to functional residues and the signaling abilities of the resultant chimeras were evaluated by determining whether changes in fluorescence intensity occurred in the presence of cognate ligand ATP (See pg. 2469, column 2, second paragraph).

One of ordinary skill in the art would have been motivated to apply the teachings of Jhaveri et al. by using fluorescent reporter to design the RNA or DNA signaling aptamers because the signaling aptamer of Jhaveri et al. can be used in generating a wide variety of signaling aptamers for use in sensor arrays (See pg. 2469, the abstract) and Jhaveri et al. indicate that fluorescent dyes were placed adjacent to functional residues and the signaling abilities of the resultant chimeras were evaluated by determining whether changes in fluorescence intensity occurred in the presence of cognate ligand ATP. It would have been prima facie obvious to have the signaling aptamer comprising an RNA nucleotide sequence or DNA nucleotide sequence with labeled fourth nucleotide by fluorescent dye.

11. Claims 3 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable respectively over Huizenga et al. (Biochemistry, 1995, Vol. 34, pg. 656-665) in view of Winnacker et al.

Art Unit: 1637

(6,426,409, issued Jul. 30, 2002) as applied to claims 1, 5 and 11 and over Huizenga et al.

(Biochemistry, 1995, Vol. 34, pg. 656-665) as applied to claims 12 and 19.

The teachings of Huizenga et al. are set forth in section 7 above and the teachings of Winnacker et al. are set forth in section 9 above and. None of the references discloses the specific skewed mole ratio of the random insert of A:C:G:U or A:C:G:T as recited in claims 3 and 14.

However, Winnacker et al. and Huizenga et al. do disclose a randomized sequence of 74 nucleotides in the RNA aptamer of Winnacker et al. (See column 9, lines 42) and the amplified dsDNA molecules consisting of 72 random nucleotides flanked by 20 nucleotide primer binding sites is in the DNA aptamer of Huizenga et al. (See pg. 658, column 2, last paragraph). Since the nucleotide sequence of the aptamer is a random sequence insert, it is inherent that the ratio of adenine, thymine, uridine, guanine and cytosine is randomized.

Therefore one of ordinary skill in the art would have been motivated to optimize the ratio of A:C:G:U in a RNA aptamer or the ratio of A:C:G:T in DNA aptamer for the best binding activity to a target. It would have been prima facie obvious to have the ratios as recited in claims 3 and 14.

12. Claims 8 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable respectively over Huizenga et al. (Biochemistry, 1995, Vol. 34, pg. 656-665), in view of Winnacker et al. (6,426,409, issued Jul. 30, 2002) as applied to claims 1, 5 and 11 and over Huizenga et al. (Biochemistry, 1995, Vol. 34, pg. 656-665) as applied to claims 12 and 19, and further in view of Heller (5,849,489, issued Dec. 15, 1998).



The teachings of Winnacker et al. are set forth in section 9 above and the teachings of Huizenga et al. are set forth in section 7 above. None of the references discloses the fluorescent dye recited in claims 8 and 18.

Heller discloses that fluorescein, Texas Red and Rhodamine Green are used as donor chromophores in designing polynucleotides having acceptor and donor chromophores (See column 6, lines 65-67).

One of ordinary skill in the art would have been motivated to apply these fluorescent dyes in a signaling aptamer because as indicated by Heller et al., target DNA can be quantitatively determined by fluorescent analysis. It would have been prima facie obvious to apply these fluorescent dyes in a signaling aptamer.

13. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huizenga et al. (Biochemistry, 1995, Vol. 34, pg. 656-665) in view of Winnacker et al. (6,426,409, issued Jul. 30, 2002) as applied to claims 1, 5 and 11 above, and further in view of Meade et al. (5,591,578, issued Jan. 7, 1997).

The teachings of Huizenga et al. are set forth in section 7 and the teachings of Winnacker et al. are set forth in section 9 above. Winnacker et al. do not disclose that the fluorescent dye label is an uradine.

Meade et al. disclose the limitations of claim 9 (See column 20, lines 47-50).

One of ordinary skill in the art would have been motivated to apply the fluorescent dye which labels a uradine because as indicated by Meade et al. the method produces complexes which can be used as new class of diagnosis probes (See column 5, lines 39-42) for mismatch detection. It would have been prima facie obvious to attach a fluorescence label to an uradine.

***Allowable Subject Matter***

14. Claims 2, 4 10, and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Concerning claims 2, 4, 10 and 13, no prior art has been found teaching or suggesting SEQ ID NO: 1, 4-7 used as a random insertion in an RNA aptamer or DNA aptamer and the signal aptamer is raf17-61C and raf17s.

**Summary**

15. No claims are allowed.

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Art Unit: 1637

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joyce Tung whose telephone number is (571) 272-0790. The examiner can normally be reached on Monday - Friday, 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on 571 272-0782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Joyce Tung *STW*  
September 23, 2007

*Kenneth R. Horlick*  
KENNETH R. HORLICK, PH.D.  
PRIMARY EXAMINER

*10/1/07*